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PROBLEMS FOR SOLUTION.

ALGEBRA.

174. Proposed by HARRY S. VANDIVER, Bala, Pa.

If the quantity x be expressed in the form of a continued fraction P_n/Q_n denoting the $(n+1)$ th convergent, with x_n the corresponding complete quotient, then $\frac{P_{n-(k+1)} - Q_{n-(k+1)}x}{P_n - Q_nx} = (-1)^{k+1}x_n \times x_{n-1} \dots x_{n-k}$.

175. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, England.

Find the conditions that $\frac{x}{m+3} + \frac{y}{m-1} + \frac{z}{m-z} = 1$, where m may be a , b , or c .

176. Proposed by MARCUS BAKER, U. S. Geological Survey, Washington, D. C.

Solve $x^2 + y^2 + z^2 = a \dots (1)$, $x + y^2 + z^2 = b \dots (2)$, $x^2 + y + z^2 = c \dots (3)$.

GEOMETRY.

197. Proposed by L. C. WALKER, A. M., Graduate Student, Leland Stanford Jr. University, Cal.

Two points P_1 , Q_1 are on a generator of a hyperboloid, and P_2 , Q_2 the corresponding points on a confocal hyperboloid. Prove $P_1Q_1 = P_2Q_2$.

198. Proposed by JOHN J. QUINN, Professor of Mathematics, Warren High School, Warren, Pa.

Trisect an angle, (1) by means of the cissoid; (2) by means of the paraboloid.

199. Proposed by F. ANDEREGG, A. M., Professor of Mathematics, Oberlin College, Oberlin, O.

Two vertices of a given triangle move along fixed right lines; find the locus of the third. [From Salmon's Conics, Sixth Edition, p. 208, ex. 10.]

CALCULUS.

163. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

Can there be a plane curve the length of which varies *directly as the abscissa* and *inversely as the ordinate* of any point on the curve?

164. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

If $m^2 + n^2 = 1$, $m^2 \cos^2 \theta + n^2 \cos^2 \varphi = A$, $a^2 b^2 \sin^2 \theta (m^2 + n^2 \cos^2 \varphi) + a^2 c^2 \cos^2 \theta \cos^2 \varphi + b^2 c^2 \sin^2 \varphi (n^2 + m^2 \cos^2 \theta) = B$, $\sqrt{(1 - m^2 \sin^2 \theta)} = \Delta(\theta)$, $\sqrt{(1 - n^2 \sin^2 \varphi)} = \Delta(\varphi)$, prove that $\int_0^{1\pi} \int_0^{1\pi} \frac{A B d\theta d\varphi}{\Delta(\theta) \Delta(\varphi)} = \frac{\pi}{6} (a^2 b^2 + a^2 c^2 + b^2 c^2)$.